APPENDIX B – U.S. ARMY CORPS OF ENGINEERS, LITTLE ROCK DISTRICT, RIVER VALLEY INTERMODAL FACILITIES, FLOODPLAIN ANALYSIS REPORT

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RIVER VALLEY INTERMODAL FACILITIES

Flood Plain Analysis

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1. Introduction

The Little Rock District, Corps of Engineers (SWL) is a Cooperating Agency for the preparation of an Environmental Impact Statement (EIS) for the Arkansas River Valley Intermodal Facilities Authority (Authority) in Russellville, Arkansas. The City of Dardanelle, Arkansas, has concerns that the proposed project will have an adverse impact on base flood elevations; therefore a flood plain analysis was made to be part of the EIS.

To be consistent with Executive Order 11988 and to satisfy the requirements of the Federal Emergency Management Agency (FEMA) for good flood plain management, the proposed River Valley Intermodal Facility cannot increase 100-year flood elevations by more than 1 foot.

This report presents a description of the analyses performed and the results obtained for the detailed flood plain analysis for the proposed River Valley Intermodal Facility. Results of this analysis include: water surface elevations for the 10-, 50-, 100-, and 500-year return period flow events pre- and post-project conditions for both the Red alternative and the Green alternative. The existing, Red alternative, and Green alternative 100-year flood plain outlines have been delineated.

2. General

2.1 Scope of Work

This study entailed development of an existing condition hydraulic model, a hydraulic model for the Red alternative, and a hydraulic model for the Green alternative.

2.2 Area to be Studied

The project area is located 75 miles northwest of Little Rock on the Arkansas River downstream of Dardanelle Lock & Dam. The project area is on the left descending bank of the river adjacent to navigation mile 202.3 in the Winthrop Rockefeller Lake pool of the McClellan-Kerr Arkansas River Navigation System.

3. Hydrologic and Hydraulic Analysis

3.1 General

Existing hydrology for the Arkansas River was used in this study. The Arkansas River discharges were determined in a discharge-frequency study for the "Arkansas River Land Impact Study", by SWL. The following discharges were used in this study.

Arkansas River Design Discharges			
10 yr	50 yr	100 yr	500 yr
310,000 cfs	430,000 cfs	485,000 cfs	625,000 cfs

3.2 Cross-Sections

Cross-sections for this study were taken from 1999 hydrographic channel surveys with overbanks from the 1983 Sediment Range surveys and the 1987 LRD-1 model. The overbanks were supplemented with 2-foot contours circa 2000. The following table lists the HEC-RAS cross-sections by Sediment Range number and Navigation Mile. The navigation mile station is identical to the "River Station" identifier in the HEC-RAS model.

Surveyed Cross-Section Locations		
Cross-Section I.D.	Navigation Mile Location	Comments
SR-257.6	205.25	U/S Study Limit
SR-257.3	205.04	
SR-257.2	204.71	
SR-256.8	204.39	
SR-256.4	204.00	
SR-256.2	203.86	
SR-255.8	203.47	
	203.42	State Highway 7 Bridge
	203.38	Approximate U/S Limit Red Alternative
SR-255.4	203.10	Approximate U/S Limit Green Alternative
SR-255.0	202.61	
SR-254.6	202.09	Approximate D/S Limit Red Alternative
SR-253.7	201.31	Approximate D/S Limit Green Alternative
SR-252.8	200.43	
SR-251.8	199.00	
SR-251.0	198.22	D/S Study Limit

3.3 Hydraulic Models

The computer program HEC-RAS, version 3.1.3 (May 2005), was used to compute existing condition water surface elevations for the 10-year, 50-year, 100-year, and 500-year flow events. The Red and Green alternative hydraulic models were developed by modifying the existing condition model using Authority supplied plans. The following tables show the HEC-RAS results for the 10-year, 50-year, 100-year and 500-year flow events for existing conditions, the Red alternative, and the Green alternative.

10-year					
River Stationing	Water Surface Profiles				
	Existing	**Red Alternative**	Increase in water surface elevation for the Red Alternative	**Green Alternative**	Increase in water surface elevation for the Green Alternative
Navigation Mile	ft	Ft	Ft	ft	Ft
205.25	316.13	316.13	0.00	316.13	0.00
205.04	316.07	316.07	0.00	316.07	0.00
204.71	315.78	315.78	0.00	315.78	0.00
204.39	315.54	315.54	0.00	315.54	0.00
204.00	315.09	315.09	0.00	315.09	0.00
203.86	314.99	314.99	0.00	314.99	0.00
203.47	314.81	314.81	0.00	314.81	0.00
Bridge 203.42					...
203.38	314.69	314.69	0.00	314.69	0.00
203.10	314.43	314.43	0.00	314.43	0.00
202.61	314.07	314.07	0.00	314.07	0.00
202.09	313.48	313.48	0.00	313.48	0.00
201.31	313.22	313.22	0.00	313.22	0.00
200.43	312.87	312.87	0.00	312.87	0.00
199.00	312.21	312.21	0.00	312.21	0.00
198.22	311.48	311.48	0.00	311.48	0.00

50-year					
River Stationing	Water Surface Profiles				
	Existing	Red Alternative	Increase in water surface elevation for the Red Alternative	Green Alternative	Increase in water surface elevation for the Green Alternative
Navigation Mile	ft	Ft	Ft	ft	Ft
205.25	322.85	322.85	0.00	322.85	0.00
205.04	322.77	322.77	0.00	322.77	0.00
204.71	322.39	322.40	0.01	322.39	0.00
204.39	322.07	322.07	0.00	322.07	0.00
204.00	321.48	321.48	0.00	321.48	0.00
203.86	321.39	321.40	0.01	321.39	0.00
203.47	321.18	321.19	0.01	321.19	0.01
Bridge 203.42					
203.38	321.01	321.01	0.00	321.01	0.00
203.10	320.73	320.73	0.00	320.73	0.00
202.61	320.3	320.30	0.00	320.30	0.00
202.09	319.66	319.66	0.00	319.66	0.00
201.31	319.37	319.37	0.00	319.37	0.00
200.43	319.14	319.14	0.00	319.14	0.00
199.00	318.47	318.47	0.00	318.47	0.00
198.22	317.75	317.75	0.00	317.75	0.00

100-year					
River Stationing	Water Surface Profiles				
	Existing	Red Alternative	Increase in water surface elevation for the Red Alternative	Green Alternative	Increase in water surface elevation for the Green Alternative
Navigation Mile	ft	Ft	Ft	Ft	Ft
205.25	325.32	325.42	0.10	325.39	0.07
205.04	325.24	325.34	0.10	325.31	0.07
204.71	324.81	324.92	0.11	324.89	0.08
204.39	324.43	324.54	0.11	324.51	0.08
204.00	323.79	323.91	0.12	323.88	0.09
203.86	323.71	323.82	0.11	323.79	0.08
203.47	323.48	323.60	0.12	323.56	0.08
Bridge 203.42					
203.38	323.28	323.40	0.12	323.37	0.09
203.10	322.99	323.11	0.12	323.08	0.09
202.61	322.53	322.63	0.10	322.60	0.07
202.09	321.98	322.04	0.06	322.01	0.03
201.31	321.72	321.75	0.03	321.75	0.03
200.43	321.5	321.50	0.00	321.50	0.00
199.00	320.83	320.83	0.00	320.83	0.00
198.22	320.1	320.10	0.00	320.10	0.00

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500-year					
River Stationing	Water Surface Profiles				
	Existing	Red Alternative	Increase in water surface elevation for the Red Alternative	Green Alternative	Increase in water surface elevation for the Green Alternative
Navigation Mile	ft	Ft	Ft	Ft	Ft
205.25	330.06	330.29	0.23	330.24	0.18
205.04	329.96	330.20	0.24	330.14	0.18
204.71	329.42	329.66	0.24	329.60	0.18
204.39	328.90	329.15	0.25	329.09	0.19
204.00	328.06	328.32	0.26	328.26	0.20
203.86	327.97	328.23	0.26	328.17	0.20
203.47	327.68	327.94	0.26	327.88	0.20
Bridge 203.42					
203.38	327.39	327.66	0.27	327.60	0.21
203.10	327.06	327.32	0.26	327.28	0.22
202.61	326.51	326.63	0.12	326.60	0.09
202.09	326.09	326.09	0.00	326.09	0.00
201.31	325.78	325.83	0.05	325.81	0.03
200.43	325.68	325.68	0.00	325.68	0.00
199.00	325.00	325.00	0.00	325.00	0.00
198.22	324.32	324.32	0.00	324.32	0.00

4. 100-Year Flood Plain Boundary

To provide a national standard, without regional discrimination, the one percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. For existing condition, the Red alternative, and the Green alternative the 100-year flood plain boundary has been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated.

5. Summary of Results

The HEC-RAS analysis show the proposed River Valley Intermodal Facility will increase 100-year water surface elevations by a maximum of 0.12 feet for the Red alternative and by 0.09 feet for the Green alternative. Therefore the proposed River Valley Intermodal Facility is consistent with Executive Order 11988 and satisfies the requirements of the Federal Emergency Management Agency for good flood plain management.

6. Digital Data Management

The following tables list the filenames for each of the HEC-RAS computer models developed for this study.

Existing	
Geometry File	Pool 9 - GAR Existing
Steady Flow File	Vertical change n-values profile check
Plan:	Existing
Short ID	Existing

Red Alternative	
10-year	
Geometry File	Pool 9 - GAR Existing
Steady Flow File	Vertical change n-values profile check
Plan:	Red Alternative 10-year event
Short ID	Red: 10-year
50-year	
Geometry File	Pool 9 - GAR Red Alternative 50-year event
Steady Flow File	Vertical change n-values profile check
Plan:	Red Alternative 50-year event
Short ID	Red: 50-year
100- & 500-year	
Geometry File	Pool 9 - GAR Red Alternative 100- & 500-year
Steady Flow File	Vertical change n-values profile check
Plan:	Red Alternative 100- & 500-year events
Short ID	Red: 100&500

Green Alternative	
10-year	
Geometry File	Pool 9 - GAR Existing
Steady Flow File	Vertical change n-values profile check
Plan:	Green Alternative 10-year event
Short ID	Green: 10-yr
50-year	
Geometry File	Pool 9 - GAR Green Alternative 50-year event
Steady Flow File	Vertical change n-values profile check
Plan:	Green Alternative 50-year event
Short ID	Green: 50-yr
100- & 500-year	
Geometry File	Pool 9 - GAR Green Alternative 100- & 500-year
Steady Flow File	Vertical change n-values profile check
Plan:	Green Alternative 100- & 500-year events
Short ID	Gren:100&500

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